USAID GEO
Guyana Economic Opportunities

Information Technology Needs Assessment for

The Ministry of Foreign Trade and International Cooperation,
The Financial Intelligence Unit and
The New Guyana Marketing Corporation

Trip Report

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Table of Contents

Part I

Information Technology Improvement Needs Assessment for the Ministry of Foreign Trade and International Cooperation

Introduction

The Ministry of Foreign Trade and International Cooperation of Guyana (Ministry of Foreign Trade, or MFT) is located in a multi-story building in the heart of Georgetown, a space it shares with the Ministry of Foreign Affairs. As the two ministries are located in the same building, sometimes with offices adjacent to one another, they have found it convenient to share office equipment and a single Internet connection as well. The purpose of this Information Technology assessment was to determine if the GEO Project could substantially improve the efficiency, capability and productivity of the Ministry of Foreign Trade's operations by improving its IT infrastructure and equipment, independent from the capabilities and operations of the Ministry of Foreign Affairs.

According to the Ministry of Foreign Trade's Web site, its mission is "to formulate and advocate a coherent and effective trade policy that will advance Guyana's multilateral, regional and bilateral trading interests." In order to advance this objective the Ministry maintains works closely with representatives of the World Trade Organization (WTO), the EU and USAID, among other international organizations, to draft trade policies and find trade partners. In order to maintain these relationships it is important for the MFT to have reliable Internet-based communication, such as email and Instant Messaging, and reliable computer client machines capable of performing basic office tasks, such as using the Microsoft Office suite, Internet browsers, and file sharing.

Following is an assessment of how the MFT's current equipment meets its information technology needs, including Internet access, ability to run office applications, and networking (file and print share). Next will be a discussion of what could be done to bring the Ministry's IT level up to an adequate standard, should that be required. Most of the information gathered for this report comes from a meeting between Graham Karlin, the author of this report, and Mohammed Sherrif, the network administrator for both ministries.

KEY FINDINGS/CURRENT NETWORK SETUP

The United Nations Development Program (UNDP) provided the Ministry of Foreign Affairs with a grant of new computer equipment 2 years ago. This equipment forms the backbone of the network that the MFT is also using for its needs. The equipment is detailed below:

- **Server:** The MFT has access to the Ministry of Foreign Affairs single server box running Windows 2000 Server.
    - Server specs: Dell PowerEdge 500SC, single 1.0 GHz Intel Pentium III processor, 1 GB RAM, two 60-GB IDE hard drives (not mirrored (RAID 1)), 56k modem, Internal power vault 100T DDS4 tape drive with ARCserve backup software. Backup power is from a Powerware 1000VA UPS.
    - Server duties: file and print share, Avert Proxy Server, Exchange 2000 (@takuba.gov.gy).
    - Backups: Sherrif has not been able to perform regular backups since he has not been able to activate ARCServe. The software is legal and licensed, but a problem with the product activation code is preventing a proper install. It is recommended that he use Windows Backup in the meantime, and contact the company to get more information on how to use the product.

- **Desktops (clients):**
    - The Ministry of Foreign Affairs also received from the UNDP seven desktops, but the exact specs were not provided me. Apparently they are Dell Optiplex desktops running Windows 2000 Professional. At any rate, these are not available to the MFT.

    - The MFT's own client workstations are a mixture of manufacturers and specs, with the typical system having a Pentium 2 processor, 64MB RAM, running Windows 98 (with some Windows 2000).

    - Currently there are 35 clients on the network, with 20 in the Ministry of Foreign Affairs and 15 in the MFT. With a staff of more than 20, MFT employees double-up on computers when those without a machine of their own need to perform computer tasks.

    - The desktops are using one of two office suites, Microsoft Office 2000 or Open Office (Open Office is apparently endorsed by UNDP).

- **Internet access:**
    - The whole office is currently sharing a single 33kbps dial-up connection, which multiple members access via the trial version of a proxy server application (Avert) installed on the server. The dial-up connection is through SDNP, the favored ISP of the Guyana government. Although

SDNP seems to provide competitive rates, its average 33.6kps connection speed is not sufficient for a single user's typical requirements, much less an entire office sharing the connection.

- **Electrical power:**
  - Since Georgetown is prone to power blackouts and brownouts, backup power is a necessity for protecting live data, and the computer equipment on which it resides. Although the new equipment the UNDP provided came with uninterrupted power supplies (UPS), many of the older systems do not have UPS units, or need new batteries.

- **Network cabling and switching**
  - The Category 5 Ethernet cabling seems to have been done well, with no reported problems. Two floors—the 4th and 5th—have a 10/100 switch, the others have 10 Mbps hubs.

RECOMMENDATIONS

1. **Server and network**
   a. Current Server: The current network setup—server, hubs, and switches—is probably sufficient for most of the current basic needs for the Ministry of Foreign Affairs and MFT, but some minor changes to the server would provide much greater redundancy and data protection in the event of hard drive or other server component failure. As it stands, the server's two drives are not set to mirror one another, a simple redundancy feature otherwise known as RAID 1 that helps protect data in the event of hard drive failure. The original specs most likely had RAID 1 in mind, as the two server drives meet the requirements for the setup, but it was never implemented. All the server's files are now saved to a single drive, with the second sitting idle, so most of the server's capability is not even being used. At the very least a RAID card should be installed on the server and the server array (the two drives together make an array) rebuilt with RAID 1. A spare hard drive should be purchased and stored nearby so that a failed drive can be replaced quickly.
   b. Backups: The ARCServe software needs to be installed correctly on the server and a full backup routine started as soon as possible. Barring that, Windows Backup (which is part of the operating system) can work as a temporary solution until another backup package is installed. Hard drives do fail, and regular tape backups are the only way to prevent catastrophic loss of data when they do. Once the backup routine is in place, file restores need to be practiced periodically from the backup tapes to make sure that data is being saved correctly.
   c. Antivirus: A centralized anti-virus software package, such as Norton Small Business Edition, needs to be installed and run from the server to make sure that all clients have reliable antivirus protection.
   d. Active Directory Design: The current Active Directory structure used in the network does not take into consideration the security needs of two agencies sharing the same server, and therefore could use a redesign to separate the two

agencies, set appropriate file permissions, and allocate resources to distinct groups.

e. Additional server resources: Two servers are always better than one, and the Ministry of Foreign Trade would benefit from having its own server, even if it remained part of the current network domain and shared the same network infrastructure. Another server would reduce the workload of the current one, and enable some specialization, with one server doing some services, like email and print server, and the other taking on different roles, such as proxy server, file sharing and domain authentication. With two servers, more fault tolerance is built into the whole system, as one server can perform essential functions and keep the office working even if one is down for an extended period. If the new server came with Windows Small Business Edition it would also have a built-in proxy server, which would obviate the need to buy the full version of Avert proxy. That said, it is difficult to fully endorse procuring another server right now since the current one is underutilized and the staff is still not fully trained in the proper use of network resources. Higher on the list of priorities for improving office productivity are the next two items, (2) Internet connectivity and (3) network clients (desktops).

2. Internet connectivity

a. With most of the office requiring email and Instant Messaging to communicate with remote offices and internationally-based colleagues, not to mention the need to perform research on-line, the easiest way to improve productivity for the Ministry of Foreign Trade would be to upgrade their Internet service. A business level DSL line through GT&T (Guyana Telephone and Telegraph) in Georgetown costs US$350 for activation and modem with the monthly fee around $175. Other services may have more competitive rates. Another options include radio-based leased line for $100 a month ($650 for installation), or simply purchasing more dialup lines through ISPs that offer higher speeds, such as 53kbps. In fact, just having one or two 53kbps dialup connections managed through a proxy server can yield decent connection speeds at a reasonable cost.

3. **Clients**

a. According to Sherrif, the MFT has an immediate need for 6 new desktops to give some critical staff their own machines. Aside from the new machines to meet current demand, it may be necessary to upgrade or replace older desktops that do not meet the minimum requirements for running Windows 2000 Professional; since Windows 98 is not capable of using the full features of a Windows 2000 Server network, all systems that have that operating system should have their hardware upgraded so that they can support a software upgrade to Windows 2000 or XP. Without a complete agency-wide upgrade to Windows 2000 or XP, many of the modern improvements in networking brought about through Windows 2000 are lost. Those machines that are too old to be upgraded should be replaced with new, Windows XP desktops.

4. Training

a. Network administration: The current network administrator for the combined Ministry of Foreign Trade/Foreign Affairs network, Mohammed Sherrif, is knowledgeable and has some experience in administering a Windows 2000 network, but some additional training would help bring his skills more into line with the needs of the office, and future growth. A mixture of formal classroom training, combined with self study (for the Windows 2000 MCSE exams, for example) and on-the-job training with a senior network engineer are all that is needed, and can be adjusted according to available funds and time.

b. Staff: According to Sherrif, a training session was held for staff on Office 2000 and Open Office, but only 56 only 61% attended. Clearly more training is needed, and a system should be developed to encourage staff to attend, and use what they have learned to improve their knowledge of computer-based tools, and learn new ways of performing common tasks.

SUMMARY

1. The Ministry of Foreign Trade, in conjunction with the Ministry of Foreign Affairs, should upgrade its Internet connectivity. Different upgrade options exist, depending on their budgets, from improved dial-up access with multiple accounts managed by proxy server, to a dedicated leased or DSL line run through a router. Improving Internet connection speed for the office is the easiest way to improve the productivity of computer users who rely on the Internet for business communication and research.

2. Additional desktops should be procured to give every professional staff member their own machine. This will eliminate doubling up of computers and improve the mix of old to new computers. Upgrading all computers still running Windows 98 is important as well, so long as they meet the minimum processor and hard drive requirements for Windows 2000, since Windows 98 is not designed for modern networking. Computers that cannot be upgraded or have systematic hardware problems need to be replaced, as their working life is probably limited to a year or less from now. New computers cost around $1100 with shipping from the US, and upgrades around $250.

3. Another server**:** While another server would provide many potential benefits to the MFT, such as redundancy and improved performance, its importance when compared to procuring additional desktops and upgrading Internet service is minimal. As an organization grows it almost always needs to increase its server-level computing power. The question remains, at the current level of usage whether an additional server is necessary. Since the current server is underutilized and staff training in using basic office tools is not complete, it may be some time before an additional server is needed. Office needs can change quickly, however, and an infusion of new staff and new software applications, such as a database, can quickly overwhelm existing resources, so the bottom line for this report is that, if possible, a new

server should be obtained for the MFT office, but the other recommended areas for improvement are more pressing.

4. Outside help and training: Should the recommendations of this report be followed, an outside IT engineering consultant will probably be needed to perform desktop and server upgrades, redesign Active Directory, configure proxy server or router configurations, and perform training.

Part II

Information Technology Improvement Needs for the Financial Intelligence Unit

Table of Contents

Introduction

I met with Rajendra Rampersaud on May 7, 2003, at the Office of the President in Guyana in order to access the IT needs for a proposed Financial Intelligence Unit (FIU) run under the Guyana Ministry of Finance.

The FIU would be based on a Trinidad-based project for the wider Caribbean Region, called CALP (Caribbean Anti-Money Laundering Program). CALP is a $7.2 million program associated with the Caribbean Financial Action Task Force (CFATF), funded by the European Union, the United States and the United Kingdom. CALP in turn finances financial intelligence units in participating countries, which are provided with equipment and training to help them investigate money-laundering cases.

The IT assessment was conducted to see what equipment and training would be required to outfit a proposed FIU in Guyana.

FINDINGS

As the Financial Intelligence Unit is only in the planning stages, there is no current network to evaluate. Mr. Rampersaud listed some of the following requirements, and they were augmented by Brian Reynolds, the Program Manager for CALP.

- The FIU would have 7-8 people, only 4-5 of whom would need a computer
- Security, both of the physical plant and the network, would be of paramount importance
- Training of all personnel would be done in-house
- The office would be under the Ministry of Finance, but have physically separate spaces and a separate computer network
- The Internet connection would most likely be dial-up with a proxy server providing security and shared Internet access
- Each desktop PC will have Windows XP as the operating system and use Office XP, with near top-of-the-line performance for corporate machines
- There should be one scanner, with automatic document feeder
- The office also needs two networked printers

RECOMMENDATIONS

Server/network:

- Initially the FIU would need only one server, but the network should be easily scalable, as the capabilities and scope of the unit could increase. The server would provide email hosting, file/print share, domain services, proxy server, data backup and centralized anti-virus protection. Furthermore, the server should have as much redundancy as possible, with redundant parts and off-site storage of data tapes
- The single rack-mounted server should be housed in a secure room, with reliable backup power provided by a diesel or gasoline-powered generator, or sine-wave inverter and a bank of batteries
- All networking equipment should be rack-mounted, and each piece provided its own uninterrupted power supply (UPS) in a secure, temperature-controlled environment

Support

- An IT specialist needs to be on staff to provide all tech support and administration. Due to the sensitivity of the information held on the servers, the network administrator needs to go through a thorough security screening process

Internet

- With 4-5 potential Internet users, a single shared 56kps dial-up connection would probably be sufficient for the FIU, at least to start with. As DSL becomes more affordable an upgrade to broadband may eventually make good business sense, as quicker Internet speeds usually improve office productivity. A proxy server or firewall, such as Microsoft ISA Server or Norton Internet Security, respectively, should always be used for security.

Please see the Addendum for detailed specifications for all IT equipment

CONCLUSIONS

The FIU for Guyana will be a small office with high security needs. This means that the equipment is relatively simple to procure, with no special requirements. Rather, the critical element of building the network is making sure the network domain is built correctly, with all possible security protocols followed in the design. This means all accounts need to be given appropriate permissions, patches installed regularly, tape backups performed daily, and equipment protected from power fluctuations. Furthermore, the whole network needs to be secure from intrusion from the Internet. This requires at a minimum active implementation of proxy settings to limit access to and from certain sites, with a good firewall installed should the network move to dedicated access (like DSL).

In order to make sure the network remains secure, all IT specialists who work on it need to have a high level of expertise in Microsoft Windows Server and related products, and be familiar with industry best practices, especially regarding security and data backup.

Since having all services on one server involves the risk that the one server will fail and leave the office without network access, the network should have an eye towards augmenting the network with additional resources, should budgets allow. As the current proposed office is small, and CALP has not set requirements for additional servers, a single-server approach would be acceptable for the envisioned office, so long as single-points of failure are reduced as much as possible through the use of redundant parts on the server.

Should the recommendations of this report be followed, an outside IT engineering consultant will probably be needed to perform the initial installation, interview candidates for the on-site network administration and perform training.

Addendum 1: Recommended IT Equipment for Guyana Financial Intelligence Unit

This is a list of recommended equipment needed by the office based upon a discussion with Rajendra Rampersaud at the Office of the President in Guyana and an email from Brian Reynolds, who is the Program Manager for CALP.

Server room needs:

- Wall-mounted air-conditioning unit
- Dry and clean, free of dust
- Locked-off for controlled access

List:

- 1x server with Windows 2000 Small Business Server for starters. I chose a rack-mounted server to make adding additional servers easier than with a tower server
- 2x Rack-mounted UPS
- 1x Rack-mounted network switch
- 1x Rack-mounted router (if needed for Internet access)
- 4x PCs with UPS
- 1x Network rack
- 2x Patch panels
- 10x Network cables
- 2x medium-capacity laser printers
- 1x scanner with Automatic Document Feeder
- 1x Copier
- 1x Shredder
- 1x Safe(s)

Server Specs (Q=1) [Est. price: $8500]

- ProLiant DL380 G3 Intel Xeon Processor 3.06GHz - Rack Model
- Processor: Intel Xeon Processor 3.06GHz/512KB
- Memory: 1GB Base Memory (2x512MB)
- Storage controller: Integrated Smart Array 5i Plus Controller
- Additional controller: Smart Array 641 Controller (RAID)
- Drive cage: Hot Plug Drive Cage-Ultra3 (5 x 1" and 1 x 1.6")
- RAID setting: RAID 5 w/Online Spare-(minimum of 4 matching drives)
- 1st hard drive: 36.4 GB Pluggable Ultra320 SCSI 10,000 rpm Universal Hard Drive (1")
- 2nd hard drive: 36.4 GB Pluggable Ultra320 SCSI 10,000 rpm Universal Hard Drive (1")
- 3rd hard drive: 36.4 GB Pluggable Ultra320 SCSI 10,000 rpm Universal Hard Drive (1")
- 4th hard drive: 36.4 GB Pluggable Ultra320 SCSI 10,000 rpm Universal Hard Drive (1")
- External DLT 40/80 GB tape drive

- redundant power supply: Hot Plug Redundant Power Supply Module (NEMA cord) (NA)
- redundant fan options: DL380 G3 Redundant Fan Option Kit (3 fans)
- monitor: Compaq S5500 15-inch CRT Color Monitor - Carbon/silver
- floppy disk drive: 1.44MB Floppy Disk Drive
- Low-profile IDE CD-ROM Drive
- Network card: Two (2) Compaq NC7781 PCI-X Gigabit NICs (embedded) PCI 10/100/1000 WOL
- Rack mounting rails: Sliding Rails and Cable Management Arm
- Operating system: Windows Server 2003 Standard Edition + 5 CALs (not installed)
- Backup Software for tape drive
- Enterprise-level Antivirus software

Desktop Specs (Q=4) [Est. price: $1700 each]

- HP Compaq d330 Slim Tower
- floppy disk drive: 1.44MB Floppy Disk Drive
- Intel Pentium 4.2GHz processor with 533MHz FSB
- 40 GB Hard Drive, ATA 100 5400 RPM
- 512 MB SDRAM
- 48x24x48x CD-RW Drive (may be omitted for security?)
- 10/100/1000 Mbps integrated Network Interface Card
- Graphics Card: Integrated 3D, 32 MB (or equivalent)
- 56k Modem
- Monitor:
- **15 inch flat panel (LCD) display (15.0 viewable)
- [Note: Although LCD displays typically cost $100 to $200 more than equivalent-size CRT monitors (the typical kind), they usually cost less to ship (due to their smaller size and weight) and use much less electricity than CRTs.]
- USB Optical Scroll Mouse
- Operating System: Windows XP Professional SP1

Printers (Q=2) [Est. Price: $1000 each]

- HP LaserJet 2300N (Q2473A)
- Printer Type: Black-and-white laser printer
- Print Speed: 25ppm (letter)
- Memory: 48MB RAM
- Processor: 266MHz
- Interface: IEEE 1284 ECP-compliant, B-size bidirectional port, 1 USB 1.1 port, HP Jetdirect 615n Fast Ethernet (10/100Base-TX) internal network print server in EIO slot
- Paper Capacity: 100-sheet multipurpose paper tray, 250-sheet paper tray
- Max. Paper Size: 8.5"x14"

    - Printer Languages: HP PCL 5e, HP PCL 6, HP PostScript 3 emulation, HP-GL/2
    - Duty Cycle: 50,000 pages per month
    - Print Technology: 6,000-page HP LaserJet cartridge, HP ProRes 1200 (1200x1200dpi)

Other items

- Desktop UPS: APC Backup UPS 650 (Q=4) [est. price: $300 each]
- Server UPS: APC 1000VA rack-mounted smart UPS [est. price: $600]
- Switch: Cisco Catalyst 2950, 24 port [est. price: $600]
- Router: Cisco 2600 series with firewall IOS (modules depend on type of Internet connection [est. price: $2000]
- Scanner: hp scanjet 7490c scanner [est. price: $700]
- Patch panel: [est. price: $75]
- 20-U network rack: [est. price: $400]
- Patch cables, .5 m and 5-m: [est. price: $6 x 12 =$72]

TOTAL estimated price for IT equipment: $22947

+ copier ($1200) and shredder ($350) : $24497, or $25000.

Additional purchases may include a 4000-watt generator, $750, or 2900 watt sine-wave inverter, $ 1100.

Part III

Scope of Work Report and Network Documentation for the New Guyana Marketing Corporation

Table of Contents

Introduction

Prior to the GEO Project's installment of new networking equipment in its office, the New Guayana Marketing Corporation had a small collection of mixed non-networked PCs running Windows 98, 2000 and XP, with Office 2000 as the standard office suite. Internet connectivity and email were provided over a dial-up connection shared by the technical members of the staff, who waited their turn to use the connection and check the single POP3 mailbox for the office. Some backups to CD-R were being made and most of the PCs seemed to have anti-virus software installed, but the frequency of updates and scans is difficult to determine.

From an earlier assessment of NGMC's needs, it was clear that increasing its office productivity would require installing a network in the office for file sharing, collaboration, and shared Internet access. As the engineer performing the network installation, my initial goal was to set up the server for file access and backup, but the Internet sharing needs of the office became an equally important priority.

NGMC is a small office, with 6 primary network users and a handful of other staff who use the two public workstations in the "computer room"—a back room with air conditioning and counter space ideal for IT equipment—when they need to access the Internet, the stand-alone database, or Office applications. With so few users and no present need for more email or dial-up accounts, the most cost-effective solution for everyone to use the Internet was to set up a proxy server. Fortunately the new server's OS, Small Business Server 2000, includes ISA Server—Microsoft's capable proxy. With this configured (by installing MS Firewall Client on each network PC), each network user is now able to access the Internet simultaneously: when a user launches a web browser, the server responds by immediately initiating a dial-up connection(if one is not already in session).

In addition to shared Internet, by adding settings to SBS' Internet Connection Configuration wizard, the single email account can now be accessed by several different simultaneous users, and whereas before each PC that accessed the POP3 account had a portion of the account's Inbox and was not able to see items stored on other machines, the account's complete settings are now housed on the server, where they can be backed up and consolidated. Of course, there are some tradeoffs to using a single Internet and POP3 mailbox for several users, and this comes through the limitation users have of logging into one single user account (Trade Marketing) to access the link the account has with the POP3 mailbox.

The server's other functions are file and print sharing, centralized anti-virus protection and file backup. The server has enough capacity to grow with the office as well. All agency files should be saved on the "Company" share, and each person's company-related yet personal work saved in their respective "User" share, each of which is located on the Desktop.

Installation Issues

POP3 Connector:

The POP3 Connector is unique to Windows Small Business Server (SBS), and is designed to give small businesses that don't have multiple dial-up and email accounts the ability to manage their POP3 account(s) via Exchange Server. (This feature is not used by larger businesses because it is usually more cost-effective to purchase an Internet domain and host their own email.) In NGMC's case, it has have a single dial-up account and a single POP3 email account -- newgmc@networksgy.com – registered through its for business emails.

The POP3 Connector works by calling up the ISP's mail server and downloading the mail to a single Exchange mailbox. The mail is then accessible through an Exchange client, such as Outlook 2000, via the user account attached to the mailbox. This enables POP3 mail to be backed up and allows multiple users to send and receive mail using the same username and mail account. This is a significant improvement over standard POP3 accounts, which leave mail on the client computer's hard drive and therefore inaccessible from multiple computers or accounts (nor backed up). Before the POP3 Connector was configured NGMC had different people downloading the mail to different computers so no one machine or person had access to the full mailbox.

In order to allow simultaneous access to the newgmc mailbox, I created a user account and Exchange mailbox called Marketing Technical, login "martech". Although each member of the technical staff at NGMC has their own Windows 2000 user accounts, they need to log in as martech to access the email box. Once they are finished with email, they can log in as themselves and send internal email via their own user accounts.

At first setting up the POP3 Connector seemed simple, as SBS has a user-friendly wizard that walks you through the setup.,Once it was up and running, however, several problems presented themselves. At first, I found that email was uploading and downloading from the ISP's server too slowly. It took over an hour to send and receive, as tested through my Chemonics and Hotmail email accounts. Another problem was the mail alias (name) that showed up on a sent message was not resolvable. In other words, if I sent a message from newgmc@networksgy.com to gkarlin@chemonics.net, the name and address that appeared in the From field was Marketing Technical and martech@newgmc.com, respectively, instead of NewGMC and newgmc@networksgy.com. If I then clicked Reply and sent the message, it wouldl not have arrived because martech@newgmc.com is not registered on the Internet. Although the slow upload/download problem took quite a while for me to fix, it was the Reply setting that was the more difficult of the two to resolve.

Problem: NGMC has a single external (i.e. over the Internet) email address which is either (1) accessible over a POP3 connection using Outlook Express or Outlook, (2) over Web access, or (3) via the office server's POP3 Connector. None of these access methods get around the main problem with a single email account: the ability to send and receive mail for multiple users.

Resolutions:

1. Continue to use the POP3 Connector and single email account hosted at ISP (Internetworks)
   a. Resolve recently-reported problem with sending email
   b. Change Reply-to address to match SMTP address for POP3 account (i.e. make the address show up as newgmc@networksgy.com instead of martech@newgmc.com
   c. Enable read and send access to Marketing Technical mailbox from all user accounts so that users do not need to log in to Marketing Technical in order to access NGMC's mail.
   d. Test all settings extensively.
   e. Train local IT admin on all settings and give suggestions and documentation for troubleshooting

   Pros:
   - The POP3 Connector is installed and configured already
   - Using the one email account does not require additional expenditures

   Cons:
   - Although the documentation I've found shows that changing the Reply-to address should not be difficult, previous attempts required extensive troubleshooting and time spent without success
   - Time spent trying to make the POP3 Connector work and keeping it functioning may not be worth the savings it affords over other options
   - Training a local administrator how to administer the POP3 Connector may be difficult (since its use is relatively rare)
   - NGMC is limited to one shared email account

2. Register domain name and host mail on NGMC server using dialup connection and Exchange 2000
   a. Register an Internet domain name for New GMC, such as NewGMC.gy.com, for three to five years and host MX (mail) records at the ISP or other place that can perform DNS resolution. Cost: $30-80 a year.
   b. Sign up for a dynamic IP service, such as Dyn DNS (http://www.dyndns.com/) or No-IP (www.no-ip.com), that can provide DNS mapping to NGMC's dynamic, dialup IP. Cost: $20 a

year. Note: No-IP can apparently host the domain name, MX records and provide the static IP service for $25 a year, an excellent value.

c. Install dynamic IP software on server.
d. Configure Exchange 2000 with proper SMTP information, mainly by setting SMTP virtual server.
e. Test for client connectivity, send and receive

Conclusion: This would take some time to configure but the domain name and MX records could be set while I am in the US. Completion would take about three days to set everything else up and test.

Pros:

- This is the way email is supposed to be: with this in place NGMC could send and receive internal and external email through the same individual user accounts, just like we do at Chemonics, and all mail would be stored on their Exchange Server, where it could be backed up
- The cost of doing this should be minimal—less than $100 a year
- This gives the office the greatest control over their own email

Cons:

- Using Exchange takes some administration to keep running; even if everything is set up correctly in the beginning, email is complex and hosting it requires troubleshooting and maintenance from time to time.
- Using dial-up access with Exchange requires extra configuration via a dynamic IP service

3. Host email at Chemonics (or other service, such as Hotmail)
   a. Send request to Chemonics IT to give NGMC user accounts.
   b. Configure client machines for email (via IMAP)

Conclusion: This is the method Go-Invest is using for email. It has the advantage of being simple and inexpensive.

Pros:

- Administration is minimal as all account activity takes place at the Chemonics office, with the only configuration being at the client side with Outlook Express or Outlook 2000/2002.

Cons:

- This method of connecting to email, IMAP, does not use any of the other features possible with Exchange and Outlook, such as Calendar and Tasks
- Reading mail requires an active Internet connection and downloads

are slower than if the server was downloading them first
- External email is not integrated with internal email
- Not very sustainable; how long would Chemonics be required to host the email

4. Go back to using the POP3 account without the POP3 Connector
   a. Disable POP3 Connector
   b. Configure ISA proxy server to allow access to ISP's servers for email download
   c. Restrict download to one desktop
   d. Optional: Train someone to download mail and store in user mailbox, so at least the mail is backed up regularly
   e. Test

   Pros:
   - This is the simplest method for downloading their current mail as there are no other services to contact and little to configure
   - NGMC can keep its mail as it is..

   Cons:
   - As stated above, this mail is difficult to back up and to enable access to other users
   - External mail access is limited to one user
   - It does not make use of the server's capabilities.

Tape Backup:

When I first installed the tape backup software—Veritas Backup Exec 9.0—I found with my first backup attempt that the tape drive controller was not working properly. After some troubleshooting I found that the cable and drive socket on the motherboard were incorrect, so I replaced the cable and placed it on the first slot instead of the second. After that backups proceeded normally.

Desktop specs:

NGMC's clients consist of 6 desktops with a mix of processors and operating systems:

- XPPublic1: New Compaq D-315 Microtower with Athlon 1600+, 256MB RAM, and Windows XP
- W98Public2: Pentium 1 or 2, 64MB RAM, Windows 98
- W95Account1: Pentium 1, 32MB, Windows 95, no NIC
- WXPTech1: New Compaq D-315 Microtower with Athlon 1600+, 256MB RAM, and Windows XP
- W98Admin1: Pentium 1 or 2, 64MB RAM, Windows 98
- W2kAdmin2: Pentium ?, 128MB RAM, Windows 2000
- XPTech2: Pentium III, 128MB RAM, Windows XP

All the above are part of the network except W95Account1, which does not have a NIC and may be too old for upgrading.

Desktop upgrades and network effectiveness:

The mix of equipment at NGMC makes it impossible to make the best use of the new network's capabilities since two of the clients are running Windows 98, an older operating system which does not support modern file permissions (NTFS). I therefore had to put all server shares on an open file system (FAT32) that Windows 98 can read. Unfortunately all the other machines with more modern operating systems (Windows 2000 and XP) need to use the same insecure files, which any computer and user on the network can read, regardless of the sensitivity of the content. The only way to make the file system more secure is to upgrade the two Windows 98 clients to Windows 2000 or XP and then upgrade the server file system to NTFS. With NTFS, access to files and folders can be limited, which is necessary if sensitive information is to be stored on the network.

There are three options for enabling the clients to read NTFS (and extend their useful life):

1. Upgrade the two Windows 98 clients to Windows 2000 (or XP).
    a. Bring PCs up to minimum requirements for running Windows 2000 (XP has higher requirements so 2000 is preferable for old machines) by installing new hardware. (See addendum: minimum requirements for installing Windows 2000 Professional).
        i. Run the Belarc Advisor software (see the addendum "using Belarc Advisor software") on each PC to be upgraded to get exact report of specifications. THIS REPORT WILL DETERMINE WHETHER THE MACHINE MEETS THE MINIMUM REQUIREMENTS FOR PROCESSOR SPEED, HARD DRIVE SPACE AND MAXIMUM INSTALLABLE MEMORY (128MB MIN.), SO MUST BE DONE FIRST
        ii. <u>If</u> machines meet minimum requirements for hard drives and processor (minimum of Pentium II), then memory can be purchased to bring the total to 128MB or the maximum installable, whichever is greater
        iii. <u>If not</u>, then the machines cannot be upgraded without replacing the processor and maybe even the motherboard, which then might make it no longer cost-effective to make the upgrade versus buying a new machine
        iv. Upgrade pricing:
            1. Memory: Standard memory for Pentium 2 computers is PC66, 168 pin, 3.3v. Pricing at one Web site gives the following prices:
            64MB, PC66, 168 Pin DIMM, 3.3v = $35

128MB, PC66, 168 Pin DIMM, 3.3v = $39
If we purchase 2x128MB, one for each, the total is = $80

2. Windows 2000 upgrade licenses = $185 each.
3. TOTAL UPGRADE COST with memory and Windows upgrade = $40 + $185 = $225 per computer.

b. Convert server drives to NTFS and confirm file access for each client computer

Pros: This is the least costly option for bringing all network clients up to Windows 2000 standards

Cons: Even with the memory upgrades the machines will still not run very fast, and with their hardware's useful life nearing completion it is hard to say how much longer they will run before critical components start to fail and need costly replacements

2. Replace the old computers with new desktops that exceed the recommended specifications for running Windows 2000 and XP
   a. It may be possible to find new desktops without expensive options for less than $1000. These would be purchased in the US via Chemonics' Procurement department and shipped as soon as possible to the GEO office.
      i. Monitors, which are big and bulky and expensive to ship, might be left out and either the agency can use the older, 15" monitors, or 17" units can be priced locally for comparison with shipping from the US

   Pros: For less than $1000 a unit the agency can have new equipment that will last several years and use modern software. With new equipment NGMC will have fewer hardware problems, plus it will be possible to institute policies and controls to minimize the network's administrative needs

   Cons: Cost.

3. Leave the old computers as they are without upgrading
   a. The network is running fairly well as it is and can continue this way indefinitely, without file security and some of the advanced features of Windows 2000.

   Pros: No added expenditure.

   Cons: Windows 98 is an operating system designed for home use and therefore cannot perform enhanced file security, multiple profiles, memory management, new drivers, remote desktop management and a host of other advantages that Windows 2000 and XP have. Having Windows 98 machines on a network reduces the capability of Windows 2000 and XP machines as well, as they have to use the same outdated file system as Windows 98.

Aside from these issues the network installation went smoothly and easily. The server is performing as it is supposed to and the network cabling is functioning properly. Most of the desktops are working well, if in need of more frequent cleaning and maintenance. Once the questions of email access, technical support and desktop upgrades for the two older machines are settled, the office will be able to realize the full potential of its equipment.

Basic server specs and configuration

Server 1: SRVR1NGMC
Services/Applications:

- Windows 2000 Small Business Server
    - Exchange 2000 Server, SP3
    - Windows 2000 Domain Controller
    - File & Print sharing
- Norton/Symantec Corporate Edition 8.0
- Veritas Backup Exec 9.0 Small Business Edition
- Veritas Backup Exec Open File Option
- Symantec Antivirus Filtering for Exchange

Serial number: 6J32KZR1L00C
Compaq Proliant ML350 G3
512MB RAM (with 3 slots free) (4GB max)
Single 2.2GHz Intel Xeon processor
Single hot-swappable power supply
4x36.4 hot-swappable SCSI hard drives
3-drive array with on-line spare: total array size--69455MB
Boot controller disk size: 69455MB
Single one on-board NIC
AIT 35GB on-board tape backup
ROM: D14 08/19/2002
PCI Device Information:

- Device 0: Lucent microelectronics LT Winmodem
- Device 1: 64bit 66MHz Dual Channel wide Ultra3 SCSI host bus adapter
- Device 1: 64bit 66MHz Dual Channel wide Ultra3 SCSI host bus adapter
- Device 2: ATI Rage XL video controller
- Device 3: NC7760 Gigabit server adapter
- Device 4: Advanced System Management Controller
- Device 6: ServerWorks CSB5 South Bridge
- Device 7: ServerWorks CSB5 IDE Controller
- Device 8: ServerWorks OSB4/CSB5 OHCI USB Controller
- Device 9: Smart Array 532 Controller

Configuration:

- Server installation software: HP SmartStart release 6.10
- Operating System: Windows 2000 Small Business Server, SP3
- Array size: 69455.

- System partition: 7168MB (or 7GB)
- User Name: NGMC
- Organization Name: Chemonics International/USAID
- Product Key: TWM62-7BWQ3-C333M-DJKMM-P4CG3
- Per seat licensing
- Web-enabled System Management Password Configuration: $pi&er$
  [Note: This is the default password for the Administrator, Operator, and User accounts. Each should have a unique password assigned once the OS install is complete. See www.hp.com/servers/manage for more details]
- Server Name: SRVR1NGMC
- Administrator/Domain administrator password: $pi&erMan

Windows SBS 2000 installation

- Using the SmartStart CD, choose the standard array choice: 3 disks in array with on-line spare.
- Choose 9GB partition (1024MB * 9). This will be the system partition.
- Choose Windows SBS 2000 installation
- Follow instructions until asked for Windows 2000 CD. Reboot.
- Windows 2000 then installs without much user interaction.
- When it gets to user-supplied parts in the GUI phase, such as language inputs, choose the defaults. Set time as best you can. I change it later on by synchronizing with a time web site.
- Time: the US East Coast, GMT -5,

Windows 2000 post-installation details:

- Once Windows installation is complete, log in as administrator
- 2 devices needed drivers:
  - Compaq SDX-400C SCSI sequential device (AIT tape drive). From Device Manager, update the driver and browse the CD from device properties (maybe Veritas will do the trick)
  - PCI simple communications controller(modem), which is installed by the driver CD's installation utility
- Set IP address
  - SRVR1NGMC--10.0.0.10
- Subnet mask: 255.255.255.0
- DNS: 10.0.0.10 (SRVR1NGMC)

Additional server settings for SRVR1NGMC

- Put the Small Business Server CD in launch the Setup for Windows 2000 Small Business Server and input the product code when asked for it
- Run the additional program installs, save SQL
- DHCP settings:
  - Range: 10.0.0.50-10.0.0.254
  - No exclusions (all static IPs for servers and printers should be within 1-49 range)
  - Lease 8 days

    - Create Domain on SRVR1NGMC: run|dcpromo
    - Choose New Forest, New Domain
    - DNS Name: NewGMC.com
    - NetBIOS: NEWGMC
    - Database and Sysvol on C: WINNT\NTDS or SYSVOL\NTDS
    - Log File: C: WINNT\NTDS
    - Permissions compatible with pre-Windows 2000 Servers
    - Directory Services Restore Mode Admin password: **Re$tore**
- Create New Volume
    - 60.83 unallocated space
    - Simple volume; disk 0; Total Volume size: 20480MB (20GB)
    - File system: FAT32 (needed for Windows 9x clients to access network resources
    - Unallocated space: 38GB. Note: FAT32 cannot use larger than 20GB partitions.

Application installation

- Install Symantec Corporate Edition, 8.0
- Server Group: Symantec Antivirus 1
- PW: **BugMan**
- Install Symantec System Center (with all options)
- Install Central Quarantine (Nizam Hassan is main contact)
- Install LiveUpdate,
    - LiveUpdate: Scheduled for daily updates at 12am
    - Initial update via symantec.com definition update site
- Install Veritas SBS Backup Exec 9.0
    - Veritas install code: 04-7357-2086-847450
    - Open File Option: 06-7587-9991-009053
    - Backup Service Account: **BackupSrvc**
    - PW**: backmeup**
    - Overwrite protection level: Partial--Prevents allocated media from being overwritten. Scratch media and media with expired overwrite protection can be overwritten.>prompt before being overwritten.
    - Overwrite scratch media before over-writing recyclable media contained in the target media set
    - Virus protection: not selected
    - Enable backup from windows Explorer: NO.

Backup Exec and Exchange Agent settings: Each server will follow a Grandfather backup scheme, with a differential backup on Monday-Thursday and a full backup on Friday. Each week will require two tapes, one Diff, one Full. The following week a new set will be used, for each month's four-week cycle, for a total of four sets of tapes, or 8 tapes total, with 4 differential tapes and 4 full backup tapes, recycled according to their exact order and restricted by their append dates. In order to save tapes, the append timing can be shortened to allow for fewer sets to be used, at least for the differential, but in general the four-set model should be followed.

A special full backup should be run the last weekend of the month and taken off-site to a secure location, such as the director's house. This tape is the Grandfather, or monthly archive, and should be labeled for the month it is run. In case a particular file or email needs to be accessed after it is erased or modified, even years later, this tape allows it to be restored.

Procedure for setting Backup Exec and Exchange Agent preferences:

- Log in as BackupSrvc
- Open Exchange's Domain Users and Computers: Create a mailbox for BackupSrvc account
- Launch Backup Wizard | Create an automated backup strategy
    - Media rotation wizard:
    - NOTE: Use Backup Folder on XPPublic1 if tape drive is unavailable
    - Tape used for normal backups
    - Selections: C:, E, Exchange Mailboxes
    - Express setup
    - Job Name: server01_Rotation01
    - Time start: 10pm
    - Full backups on Friday.
    - Differential-M-TR
    - Rotation-full: 4 weeks, 3 day append
    - Diff-4 weeks, 6 day append

Active Directory Design

Introduction: Since NGMC has few users and no remote offices to link, the Active Directory design was fairly straightforward. I used a single forest with groups created by the SBS New User Wizard. Nizam and Rodlyn are set as Power Users. All other have simple User permissions. Nizam will be left with a copy of the network settings documentation, including the administrative password, but should not need admin privileges on his account.

I put each user in an OU called NGMC. A user template is not necessary since the To Do list with SBS works fine for setting all permissions and mapping all drives. The only change I made to the accounts was to set roaming profiles.

Shared directories: Small Business Server creates two shares during its setup, called Users and Company, and maps the drives to each new user's desktop with a standard login script, so nothing manually had to be done except confirm that the shares appear on the user's desktop and are accessible via My Computer or Explorer.

Profiles: Each user has a roaming profile in order to simplify administration. Administrators should not use it however, since they can configure their own desktop.

Exchange Settings

The principal settings for Exchange were set by running the SBS Internet Connection Wizard, and consist primarily of the POP3 Connector settings. When and if the agency acquires its own Internet domain it will be necessary to set a default SMTP

server, IMAP and OWA virtual servers and match them with an IP mapped via MX records to an Internet domain name. In the meantime, the POP3 Connector is set to route mail to and from the Marketing Technical user account and respond to Outlook Send/Receive requests.

Remaining tasks

Before next G. Karlin TDY

- Hire local IT technical support
- Run Belarc Advisor software on each computer to establish hardware and software. Email Graham the results
- Finalize status of possible upgrade or replacement of two Windows 98 desktops
- Purchase all necessary supplies

During next G. Karlin TDY

- Finalize email settings so that all mail is received and sent properly, regardless of the type of access used (see above discussion)
- Train local technical support on backup routines, email and anti-virus system, account creation and maintenance, and other SBS and Windows 2000 items
- Check tape backup device for mechanical failure and prepare alternative to tape to eliminate single-point-of-failure in backup system (already started with backups to XPPublic1)
- If all clients moved to Windows NT/2000/XP systems, install file security, group policies and set printer and folder permissions
- Document all significant network changes and occurrences

Passwords:

Administrator/Domain administrator password: **$pi&erMan**

Web-enabled System Management Password Configuration. User name: Administrator; PW: **$pi&er$**

Directory Services Restore Mode Admin password: **Re$tore**

Symantec Antivirus 1 Server Group, PW: **BugMan**

Backup Service Account: **BackupSrvc**
PW**: backmeup**

An example system that we could buy is:

Base System Intel® Pentium® 4 2.2 GHz Presario S4000V PC $50 Mail in Rebate ***FREE SHIPPING*** $836.94

Monitor CV7500 17in. CRT Display - Edit

Operating System Windows XP Professional Edition Operating System - Edit

Memory 256MB PC2700 DDR SDRAM (1DIMM) - Edit

Hard Drive 40 GB 5400 rpm Ultra DMA Hard Drive - Edit

CD or DVD Drive 48X max. CD-ROM Drive - Edit

Keyboard and Mouse Presario Keyboard & Optical Scroll Mouse - Edit

Sound Card Integrated 5.1 Capable Sound w/ Front Audio ports - Edit

Video Card Integrated Graphics - Edit

Removable Storage 1.44 MB Floppy Drive - Edit

Business Productivity Microsoft(r) Office XP Small Business Edition - Edit

Using Belarc Advisor Software.

1. Place CD with Belarc Advisor application in the CD-ROM.
2. Run the setup file
3. Wait for it to perform its examination
4. Send results to gkarlin@chemonics.net

System Hardware Requirements and Recommendations for Running Windows 2000 Professional

According to Microsoft:

http://www.microsoft.com/windows2000/professional/evaluation/sysreqs/default.asp

Here are the minimum system requirements for running the Windows® 2000 Professional operating system.

Minimum Requirements	
Computer/Processor	133 MHz or higher Pentium-compatible CPU.
Memory	At least 64 megabytes (MB) of RAM; more memory generally improves responsiveness.
Hard Disk	2 GB with 650 MB free space.
CPU Support	Windows 2000 Professional supports single and dual CPU systems.
Drive	CD-ROM or DVD drive.
Display	VGA or higher resolution monitor.
Keyboard	Required.

According to other IT professionals:

https://engineering.purdue.edu/ECN/Resources/Documents/Windows/policy/0001

Windows 2000 Professional

Below are the minimum requirements for systems running Microsoft Windows 2000 Professional.

	Required Minimum	Recommended Minimum
Processor	Intel Pentium II 300MHz (or equivalent)	Intel Pentium III 450MHz (or equivalent)
Memory	128MB	256MB
Hard Disk	10GB (5400RPM)	20GB (UDMA/66, 7200RPM)
Video Adapter	2MB PCI adapter	4MB PCI adapter
Monitor	15" capable of 640x480@60Hz	17" capable of 1024x768@60Hz

The latter specs are probably more accurate. Microsoft tends to understate the minimum hardware requirements (to get more customers?) so it is better to listen to the voices of experience.

Upgrade Prices

Memory for Pentium II systems, from 4AllMemory.com (http://www.4allmemory.com/index.cfm?fuseaction=search.sdram_memory_desktop)

PC66 SDRAM

Memory Module	Part Number	Retail Price	You Save	Your Price	Qty	Order
32MB, PC66, 168 Pin DIMM, 3.3v	80523	$33.28	$3.33	**$29.95**	1	Buy
64MB, PC66, 168 Pin DIMM, 3.3v	80746	$38.83	$3.88	**$34.95**	1	Buy
128MB, PC66, 168 Pin DIMM, 3.3v	80106	$43.28	$4.33	**$38.95**	1	Buy

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Windows 2000 Professional Upgrade, from Amazon.com (http://www.amazon.com/exec/obidos/ASIN/B00003JAU9/macinfindcom/002-4428347-5529620)
Price: $184.99